3.14 Dot Product of Vectors

Key 52 pts. 4 pts. each

Name_____ Date _____ Period _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Find a · b.

1) $\mathbf{a} = \langle 5, 3 \rangle$, $\mathbf{b} = \langle 12, 4 \rangle$ — 1) 72

2) $\mathbf{a} = \langle -5, 2 \rangle$, $\mathbf{b} = \langle 8, 13 \rangle$ — 2) -14

3) $\mathbf{a} = \langle 4, 5 \rangle$, $\mathbf{b} = \langle -3, -7 \rangle$ — 3) -47

4) $\mathbf{a} = \langle -2, 7 \rangle$, $\mathbf{b} = \langle -5, -8 \rangle$ — 4) -46

5) $\mathbf{a} = -4\mathbf{i} - 9\mathbf{j}$, $\mathbf{b} = -3\mathbf{i} - 2\mathbf{j}$ — 5) 30

6) $\mathbf{a} = 2\mathbf{i} - 4\mathbf{j}$, $\mathbf{b} = -8\mathbf{i} + 7\mathbf{j}$ — 6) -44

7) $\mathbf{a} = 7\mathbf{i}$, $\mathbf{b} = -2\mathbf{i} + 5\mathbf{j}$ — 7) -14

8) $\mathbf{a} = 4\mathbf{i} - 11\mathbf{j}$, $\mathbf{b} = -3\mathbf{j}$ — 8) 33

Use the dot product to find $|\mathbf{v}|$.

9) $\mathbf{v} = \langle 5, -12 \rangle$ — 9) 13

10) $\mathbf{v} = \langle -8, 15 \rangle$ — 10) 17

11) $\mathbf{v} = -4\mathbf{i}$ — 11) 4

12) $\mathbf{v} = 3\mathbf{j}$ — 12) 3

Find the angle between the given vectors to the nearest tenth of a degree.

13) $\mathbf{u} = \langle -4, -3 \rangle$, $\mathbf{v} = \langle -1, 5 \rangle$ — 13) 115.6°

14) $\mathbf{u} = \langle 2, -2 \rangle$, $\mathbf{v} = \langle -3, -3 \rangle$ — 14) 90°

15) $\mathbf{u} = \langle 2, 3 \rangle$, $\mathbf{v} = \langle -3, 5 \rangle$ — 15) 64.65°

16) $\mathbf{u} = \langle 5, 2 \rangle$, $\mathbf{v} = \langle -6, -1 \rangle$ — 16) 167.66°

17) $\mathbf{u} = 3\mathbf{i} - 3\mathbf{j}$, $\mathbf{v} = -2\mathbf{i} + 2\sqrt{3}\mathbf{j}$ (-6 $-6\sqrt{3}$)

17) 165°

18) $\mathbf{u} = -2\mathbf{i}$, $\mathbf{v} = 5\mathbf{j}$

18) 90°

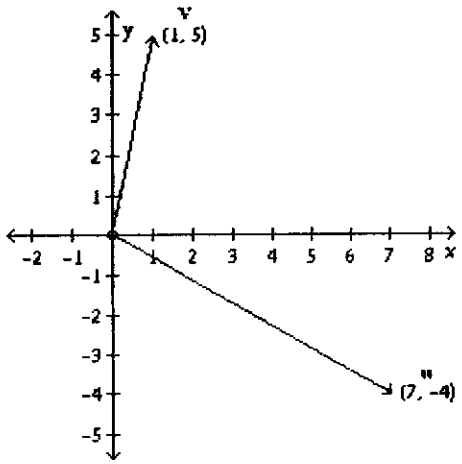
19) $\mathbf{u} = \left(2\cos\frac{\pi}{4}\right)\mathbf{i} + \left(2\sin\frac{\pi}{4}\right)\mathbf{j}$, $\mathbf{v} = \left(\cos\frac{3\pi}{2}\right)\mathbf{i} + \left(\sin\frac{3\pi}{2}\right)\mathbf{j}$

19) 135°

20) $\mathbf{u} = \left(\cos\frac{\pi}{3}\right)\mathbf{i} + \left(\sin\frac{\pi}{3}\right)\mathbf{j}$, $\mathbf{v} = \left(3\cos\frac{5\pi}{6}\right)\mathbf{i} + \left(3\sin\frac{5\pi}{6}\right)\mathbf{j}$

20) 90°

21)



21) 108.4°

Determine whether the vectors u and v are parallel, orthogonal, or neither.

22) $\mathbf{u} = \langle 5, 3\rangle$, $\mathbf{v} = \langle -10/4, -3/2\rangle$

22) Parallel

23) $\mathbf{u} = \langle 15, -12\rangle$, $\mathbf{v} = \langle -4, 5\rangle$

23) Neither

24) $\mathbf{u} = \langle 5, -6\rangle$, $\mathbf{v} = \langle -12, -10\rangle$

24) Orthogonal

25) $\mathbf{u} = \langle -3, 4\rangle$, $\mathbf{v} = \langle 20, 15\rangle$

25) Orthogonal

26) $\mathbf{u} = \langle 2, -7\rangle$, $\mathbf{v} = \langle -4, 14\rangle$

26) Parallel